Claims 6-7, 9-10, 15-16, 18-19, 26-27, and 29-30 are now canceled without prejudice.

Claims 1-5, 8, 11-14, 17, 20-25, 28, and 31-33 are now amended.

The Applicant gratefully acknowledges the Examiner's consideration of the present application and respectfully requests reconsideration of the amended claims 1-5, 8, 11-14, 17, 20-25, 28, and 31-33.

II. Amendments to the Claims

Claims 1, 13, 25 and 31 have been amended to recite one or more "test fixtures," each "test fixture" including one or more "multiple-port signal paths" and one or more "sample cavities." One example of the recited test fixture is illustrated in Fig. 3A and corresponding description provided on page 20, lines 12 to 32.

Each "multiple-port signal path" (an input port and an output port in one embodiment) includes "a transmission line", "a ground element", and "a dielectric substrate attached therebetween," the recited multiple-port signal path "operable to support the propagation of a test signal at one or more frequencies between 10 MHz and 1000 GHz." The recited "transmission line/dielectric substrate/ground plane" configuration is illustrated in examples throughout the specification, for instance in Fig. 1A. The recited test signal frequency range is also described in various locations, for instance in the paragraph beginning on line 20, page 12.

Claims 1, 13, 25, and 31 have been amended to recite one or more sample cavities, each "configured to retain a volume of sample adjacent to the multiple-port signal path, whereby an input test signal propagating along the multiple-port signal path is electromagnetically coupled to the sample." One example of the recited sample cavity (340) is illustrated in Fig. 3A, and an accompanying description is provided on page 20, beginning on line 6. In the illustrated example of Fig. 3A, the sample is retained adjacent to the "multiple-port signal path" by an O-ring 320 which confines the sample to the top of the bio-assay device chip

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400, thereby permitting a signal propagating along the top transmission line to be electromagnetically coupled to the sample.

Amendments have been made to clarify the connectivity between the recited elements. The term "connected" is used to specify electronic and test signal connections between the recited components and does not preclude the presence of intervening components or circuitry between the connected elements. Other amendments have been made to provide proper antecedent basis.

III. Response to the Examiner's Rejections

Claims 1-33 stand rejected under 35 USC § 112, 2nd paragraph as omitting structural cooperative relationships between the recited elements of the signal path, the measurement system and the computer. The applicant has amended claims 1, 12-14, 25 and 31 to clarify the connectivity between recited components and submits that all pending claims comply with the requirements of 35 USC § 112, 2nd paragraph.

Claims 1-33 stand rejected under 35 USC § 103(a) as being unpatentable over USP 5,858,666 to Weiss (herein "Weiss '666") or USP 5,653,939 to Hollis (herein "Hollis '939"), each in view of Hollis et al. (1980), IEEE Transaction on Microwave Theory and Techniques, MTT-28(7): 791-801 (herein "Hollis article"). The Applicant submits that this rejection is traversed based on the foregoing amendments and following remarks.

The Present Invention

As presently amended, each of the independent claims 1, 13, 25 and 31 recites one or more test fixtures, each test fixture including one or more multiple-port signal paths, and one or more sample cavities. Each multiple-port signal path includes "a transmission line", "a ground element", and "a dielectric substrate attached therebetween," the recited multiple-port signal path "operable to support the propagation of a test signal at one or more frequencies from 10 MHz to 1000 GHz." Each sample cavity is "configured to retain a volume of sample adjacent to the signal path, whereby an input test signal propagating along the multiple-port signal path is

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electromagnetically coupled to the sample." One example of this arrangement is illustrated in Fig. 3A.

The applicant now considers the amended claims in view of the previously cited references of Hollis '939, Weiss '666, and the Hollis article.

Hollis '939

The applicant notes that Hollis '939 does not illustrate a multiple-port signal path comprising a "transmission line, a ground plane, and a dielectric layer attached therebetween," the multiple-port signal path being "operable to support the propagation of a test signal at one or more frequencies from 10 MHz to 1000 GHz." Specifically, Hollis '939 does not illustrate or describe a "ground plane" or a "dielectric substrate" attached between the transmission line and the ground plane, nor is there any description or illustration of test signals used in the range from 10 MHz to 1000 GHz.

In Col. 7, lines 45-47, Hollis '939 does mention that the transmission line in Fig. 9 may comprise a "micro-miniature version of microstrip, stripline, or co-planar waveguide..." all of which could possibly include a ground plane and dielectric substrate attached between the ground plane and transmission line. However, without any illustrations or statements describing a ground plane, a dielectric substrate, and their physical location relative to each other or the transmission line, it is unclear if these features were intended. If intended, it is unclear as to whether the hypothetical signal path would be "operable to support the propagation of a test signal at one or more frequencies from 10 MHz to 1000 GHz," as the only illustrated data (Fig. 7) extends to 1 MHz (10^7 Hz). As Hollis '939 does not contain any explicit reference to, or illustration of, applicant's recited "ground element" and "dielectric substrate" attached between the transmission line and ground element, or applicant's test signal frequency range, applicant's pending claims are allowable thereover.

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The Hollis Article

Referring now to the Hollis article, the applicant acknowledges that the Hollis article teaches a multiple-port (two-port) signal path in the form of a coaxial cable section (see Figs. 2, 4 and 5) in which the center conductor operates as the transmission line, the outer shielding operating as the ground plane, and the Teflon® insulating material operates as the dielectric substrate attached between the transmission line and ground plane. The applicant submits, however, that Hollis' "sample cavity" (referred to as a "sample holder" therein) does not "retain the sample *adjacent to* the multiple-port signal path;" the sample cavity of Hollis actually *forms an integral part of* the multiple-port signal path.

Referring now to Fig. 2 of the Hollis article, it can be seen that at the transition point of the coaxial cable and sample cavity, the Teflon® insulator terminates. At this point, the "multiple-port signal path" no longer includes the Teflon® "dielectric substrate attached therebetween (the transmission line and ground plane)." Over this region, the sample itself functions as the "dielectric substrate" extending between the transmission line (center conductor) and ground plane (the outer shielding). In this instance, the sample is no longer located "*adjacent* to the multiple-port signal path," it would form an integral part of it. Accordingly, applicant's claims reciting a sample cavity retaining a sample adjacent to a multiple-port signal path, the signal path comprising a transmission line, ground plane, and dielectric substrate extending therebetween, is allowable over the Hollis article.

One may argue that at the coaxial cable/sample cavity transition point, the contained sample is located "adjacent to," i.e., at the end of, the "signal path," i.e., the coaxial cable. While not intending to present a complete rebutting argument here, the Applicant notes that the recited bio-assay test fixture recites a *multiple-port* structure, having at least one input port and at least one output port. If the aforementioned argument is adopted, the resulting structure would consist of only a single port device, the single port consisting of the termination of the coaxial cable. Modifying this structure to a two-port device would result in the illustrated structure of the Hollis article in which the sample forms an integral part of the signal path.

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Weiss '666

Weiss '666 does not illustrate applicant's recited signal path structure. Specifically, Weiss '666 does not disclose "a ground element," or a "dielectric substrate" attached between a transmission line and the ground element." Weiss '666 discloses orthogonally oriented transmission lines 32 and 42. However, there is no showing or suggestion of a "ground element" in relation to either of the transmission lines 32 or 42 or a "dielectric substrate" that extends between one or more of the transmission lines 32 or 42 and a ground element. The test signal in Weiss '666 propagates along both of the transmission lines 32 and 42. Accordingly, neither of the transmission lines 32 or 42 will operate as a "ground element" (i.e. remaining at zero potential) as the voltage on both transmission lines 32 and 42 will vary as the test signal voltage varies.

Conclusion

The Applicant submits that all pending claims are in condition for allowance and requests a notice to that effect. A telephone call to the Applicant's representative, Clifford Perry, at (510) 576-2339 is invited should the Examiner have any questions regarding the present application.

Respectfully submitted,

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